

Dual N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- Surface-mounted package
- Advanced trench cell design

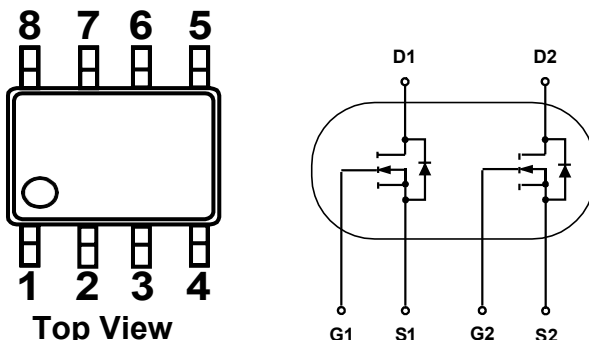
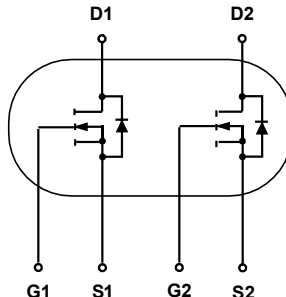
1.2 Applications

- LCD TV appliances
- High power inverter system
- LCDM appliances

1.3 Quick reference

- $BV \geq 60\text{ V}$
- $R_{DS(ON)} \leq 32\text{ m}\Omega @ V_{GS} = 10\text{ V}$
- $P_{tot} \leq 2\text{ W}$
- $R_{DS(ON)} \leq 38\text{ m}\Omega @ V_{GS} = 4.5\text{ V}$
- $I_D \leq 8\text{ A}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol	
1	Source(S1)			
2	Gate(G1)			
3	Source(S2)			
4	Gate(G2)			
5,6	Drain(D2)			
7,8	Drain(D1)			
				<p>Top View</p> <p>SOP- 8L</p>

3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	$T_A = 25\text{ }^\circ\text{C}$	-	60	V
V_{GS}	Gate-Source Voltage	$T_A = 25\text{ }^\circ\text{C}$	-	± 20	V
I_D^*	Drain Current	$T_A = 25\text{ }^\circ\text{C}, V_{GS} = 10\text{ V}$	-	8	A
		$T_A = 100\text{ }^\circ\text{C}, V_{GS} = 10\text{ V}$	-	3.9	A
$I_{DM}^{*,**}$	Pulsed Drain Current	$T_A = 25\text{ }^\circ\text{C}, V_{GS} = 10\text{ V}$	-	24.8	A
P_{tot}	Total Power Dissipation	$T_A = 25\text{ }^\circ\text{C}$	-	2	W
T_{stg}	Storage Temperature		- 55	150	$^\circ\text{C}$
T_J	Junction Temperature		- 55	150	$^\circ\text{C}$
I_S	Diode Forward Current	$T_A = 25\text{ }^\circ\text{C}$	-	8	A
$R_{\theta JA}^*$	Thermal Resistance- Junction to Ambient		-	62.5	$^\circ\text{C} / \text{W}$

Notes:

* Surface Mounted on 1 in² pad area, $t \leq 10\text{ sec}$

** Pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$

4. Marking Information

Product Name	Marking
SN4946S	<div style="display: flex; align-items: center;"> <div style="background-color: black; color: white; padding: 5px; margin-right: 10px;"> 4946 YWWXXX </div> <div> YWW: Date Code </div> </div>

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
SN4946S	SOP8			3000	

Note: NHCX defines " Green " as lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed 900 ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500 ppm by weight; Follow IEC 61249-2-21 and IPC / JEDEC J-STD-020C)

6. Electrical Characteristics ($T_A=25\text{ }^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_{DS} = 250\text{ }\mu\text{A}$	60	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_{DS} = 250\text{ }\mu\text{A}$	1.0	-	2.0	V
I_{DSS}	Drain Leakage Current	$V_{DS} = 48\text{ V}, V_{GS} = 0\text{ V}$	-	-	1	μA
		$T_J = 85\text{ }^\circ\text{C}$	-	-	30	μA
I_{GSS}	Gate Leakage Current	$V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$	-	-	± 100	nA
$R_{DS(ON)}^a$	On-State Resistance	$V_{GS} = 10\text{ V}, I_{DS} = 6\text{ A}$	-	27	32	m Ω
		$V_{GS} = 4.5\text{ V}, I_{DS} = 3\text{ A}$	-	34	38	
Diode Characteristics						
V_{SD}^a	Diode Forward Voltage	$I_{SD} = 6\text{ A}, V_{GS} = 0\text{ V}$	-	-	1.3	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 6\text{ A}, dI_{SD}/dt = 100\text{ A}/\mu\text{s}$	-	12.2	-	ns
Q_{rr}	Reverse Recovery Charge		-	2.2	-	nC
Dynamic Characteristics^b						
C_{iss}	Input Capacitance	$V_{GS} = 0\text{ V}, V_{DS} = 15\text{ V}$ Frequency = 1 MHz	-	1051	-	pF
C_{oss}	Output Capacitance		-	42	-	
C_{rss}	Reverse Transfer Capacitance		-	35	-	
$t_d(on)$	Turn-on Delay Time	$V_{DS} = 30\text{ V}, V_{GEN} = 10\text{ V},$ $R_G = 4.5\text{ }\Omega, R_L = 5\text{ }\Omega, I_{DS} = 6\text{ A}$	-	7.4	-	ns
t_r	Turn-on Rise Time		-	26	-	
$t_d(off)$	Turn-off Delay Time		-	17.6	-	
t_f	Turn-off Fall Time		-	28	-	
Gate Charge Characteristics^b						
Q_g	Total Gate Charge	$V_{GS} = 10\text{ V}, V_{DS} = 30\text{ V},$ $I_{DS} = 6\text{ A}$	-	19.5	-	nC
Q_{gs}	Gate-Source Charge		-	5.4	-	
Q_{gd}	Gate-Drain Charge		-	2.6	-	

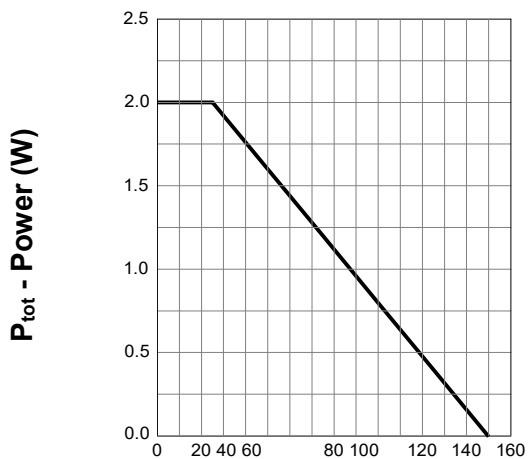
Notes:

a : Pulse test ; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$

b : Guaranteed by design, not subject to production testing

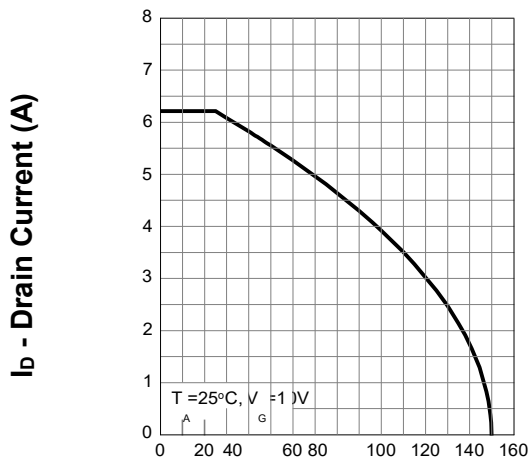
7. Typical Characteristics

Power Capability



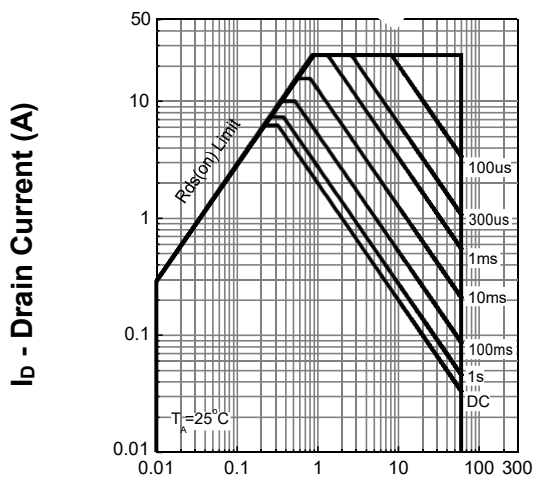
T_{mp} - Mounting Point Temp. (°C)

Current Capability



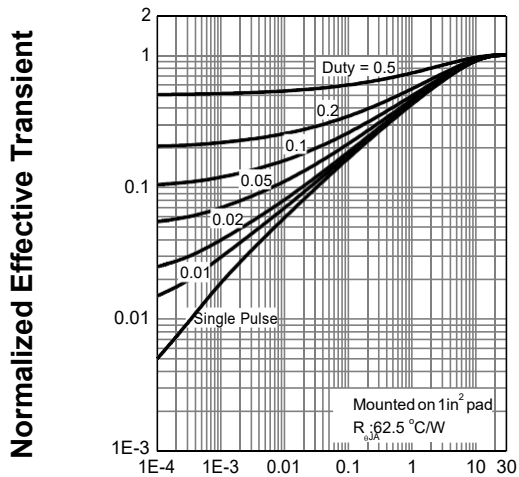
T_{mp} - Mounting Point Temp. (°C)

Operating



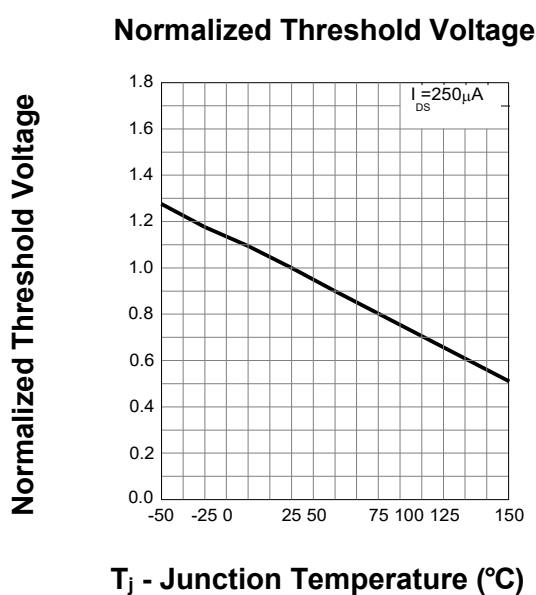
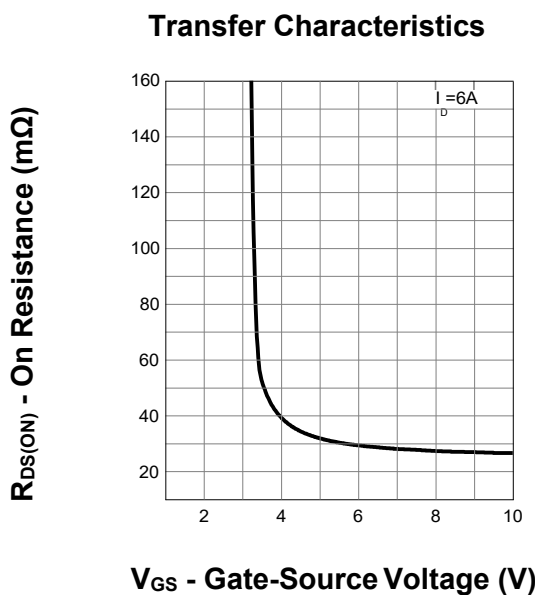
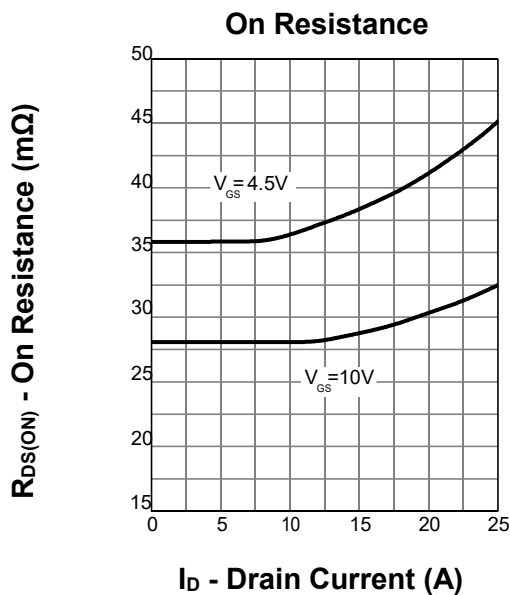
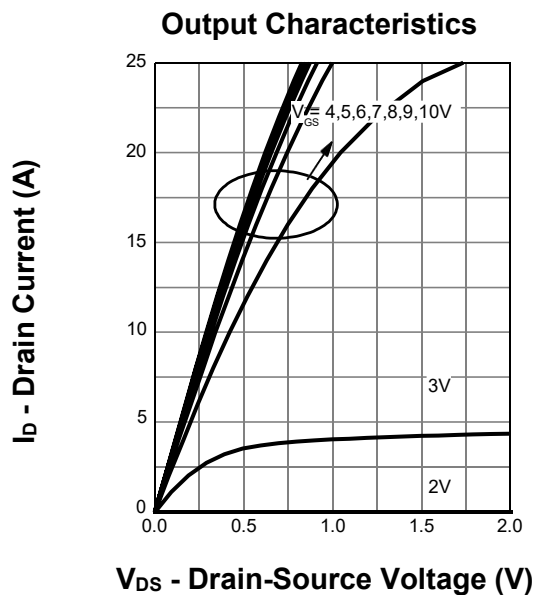
V_{DS} - Drain-Source Voltage (V)

Transient Thermal Impedance



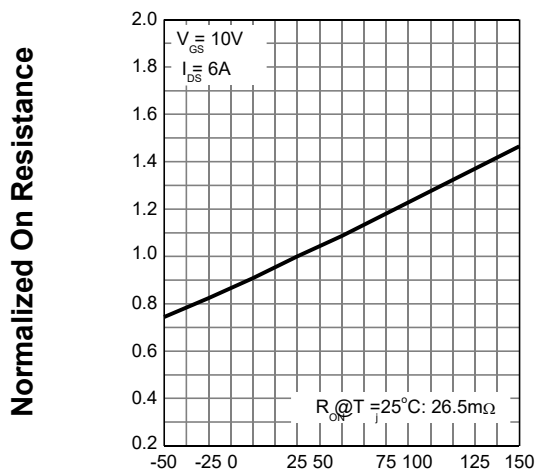
Square Wave Pulse Duration (sec)

7. Typical Characteristics (cont.)



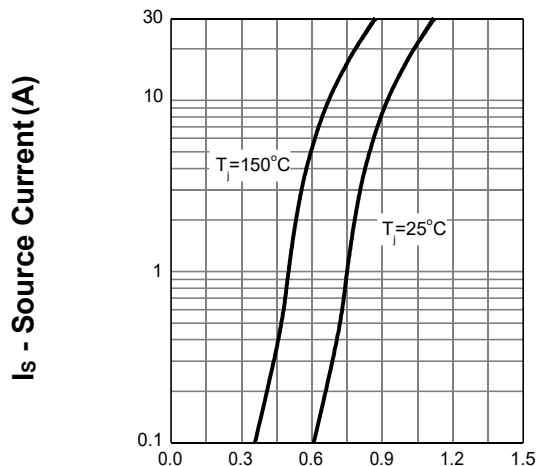
7. Typical Characteristics (cont.)

Normalized On Resistance



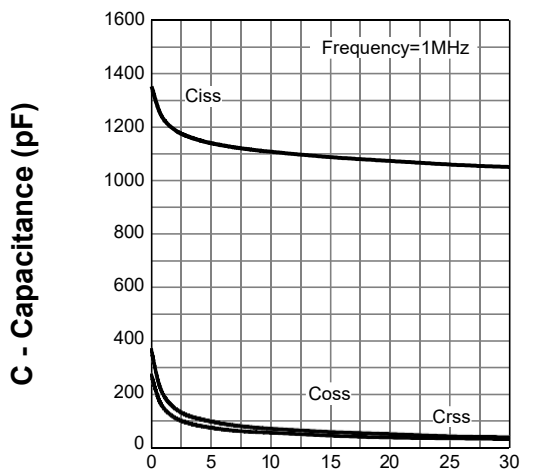
T_j - Junction Temperature ($^{\circ}C$)

Diode Forward Current



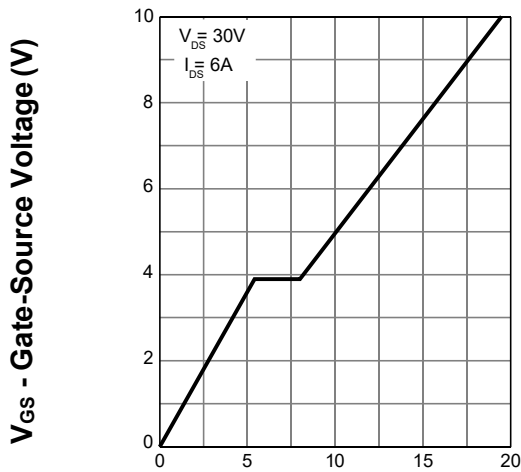
V_{SD} - Source-Drain Voltage (V)

Capacitance



V_{DS} - Drain-Source Voltage (V)

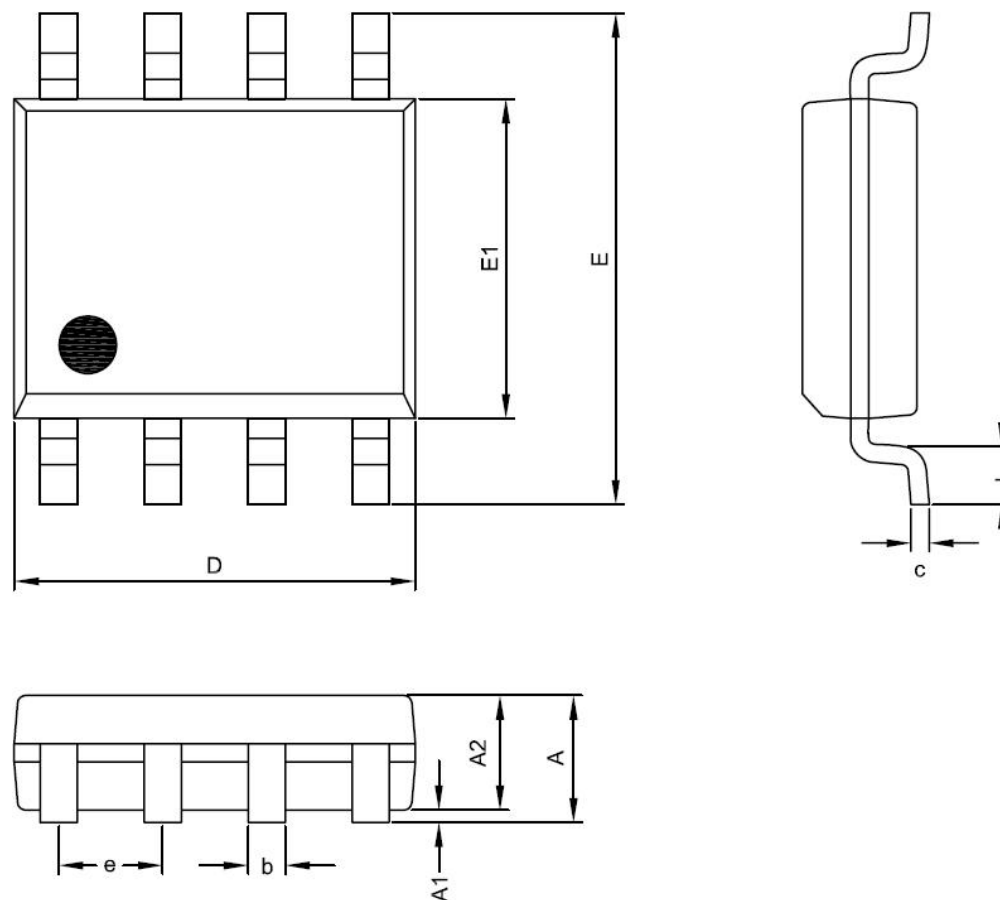
Gate Charge



Q_G - Gate Charge (nC)

8. Package Dimensions

SOP- 8L



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	1.35	1.75
A1	0.00	0.25
A2	1.15	1.50
D	4.80	5.00
E	5.80	6.20
E1	3.80	4.00
c	0.19	0.27
b	0.33	0.53
e	1.27 BSC	
L	0.40	1.27

Notes:

1. Jedec outline : MS-012AA
2. Dimensions " D " does not include mold flash, protrusions and gate burrs shall not exceed .15 mm (.006 in) per side .
3. Dimensions " E1 " does not include inter-lead flash, or protrusions. Inter-lead flash and protrusions shall not exceed .25 mm (.010 in) per side.